

## Negative Output Low Drop Out voltage regulator

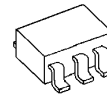
### ■ GENERAL DESCRIPTION

The NJM2828 is a negative output low dropout regulator. Advanced bipolar technology achieves low noise, high precision voltage and high ripple rejection.

It has soft-start and shunt SW function. 1.0 $\mu$ F Output capacitor and small package can make NJM2828 suitable for portable items.

### ■ PACKAGE OUTLINE

SC88A

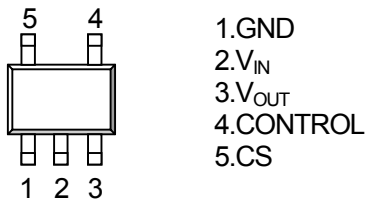


NJM2828F3

### ■ FEATURES

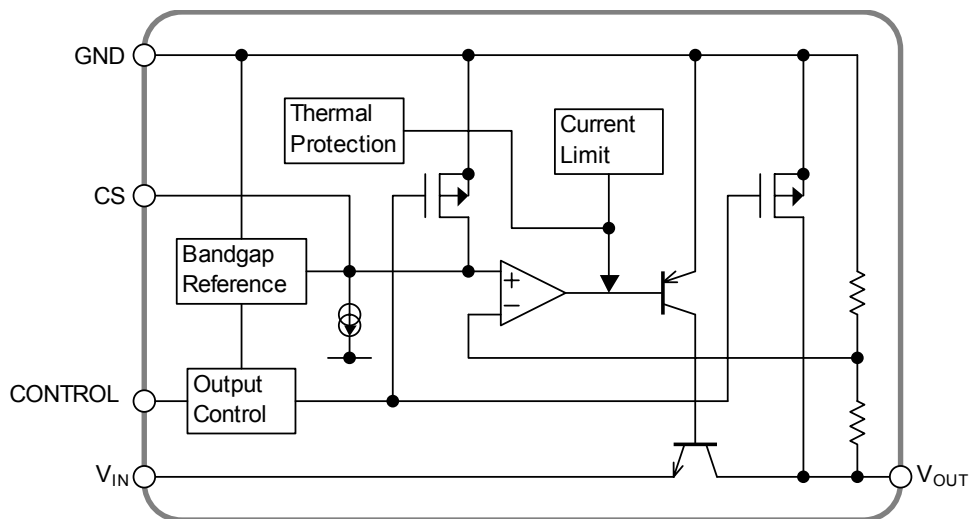
- Low Current Consumption    0.13V (typ.) @ $I_o=60\text{mA}$
- High Precision Output         $\pm 1.5\%$
- High Ripple Rejection       65dB(typ.) @ $f=1\text{kHz}$ ,  $V_o=-7\text{V}$  Version
- Output capacitor with 1.0F ceramic capacitor.
- Output Current                 $I_o(\text{max.})=100\text{mA}$
- ON/OFF Control(Positive voltage control from 0 to +5V)
- Soft-start Function
- Shunt SW Function
- Internal Thermal Overload Protection
- Internal Short Circuit Current Limit
- Bipolar Technology
- Package Outline                SC88A

### ■ PIN CONFIGURATION



NJM2828F3-XX

### ■ EQUIVALENT CIRCUIT



# NJM2828

## ■ OUTPUT VOLTAGE RANK LIST

Device Name	V <sub>OUT</sub>	Device Name	V <sub>OUT</sub>
NJM2828F3-14	-1.4V	NJM2828F3-06	-6.0V
NJM2828F3-15	-1.5V	NJM2828F3-63	-6.3V
NJM2828F3-02	-2.0V	NJM2828F3-65	-6.5V
NJM2828F3-22	-2.2V	NJM2828F3-07	-7.0V
NJM2828F3-03	-3.0V	NJM2828F3-75	-7.5V
NJM2828F3-04	-4.0V	NJM2828F3-08	-8.0V
NJM2828F3-05	-5.0V	NJM2828F3-85	-8.5V
NJM2828F3-51	-5.1V	NJM2828F3-09	-9.0V
NJM2828F3-55	-5.5V	NJM2828F3-10	-10.0V

Output voltage options available : -1.5 ~ -10.0V (0.1V step)

## ■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V <sub>IN</sub>	-14	V
Control Voltage	V <sub>CONT</sub>	+5	V
Power Dissipation	P <sub>D</sub>	250(*1)	mW
Operating Temperature	Topr	-40 ~ +85	°C
Storage Temperature	Tstg	-40 ~ +125	°C
Output Sink Current at OFF-state	I <sub>SINK(OFF)</sub>	10	mA

(\*1): Mounted on glass epoxy board. (114.3×76.2×1.6mm : 2layer,FR-4)

## ■ Operating voltage

V<sub>IN</sub>=-3.2 ~ -12V (In case of Vo>-3.0V version)

## ■ ELECTRICAL CHARACTERISTICS

( $V_o < -2.2V$  Version:  $V_{IN} = V_o - 1V$ ,  $V_{CONT} = 3V$ ,  $C_{IN} = 0.1\mu F$ ,  $C_o = 1.0\mu F$ ,  $T_a = 25^\circ C$ )

( $V_o \geq -2.2V$  Version:  $V_{IN} = -3.2V$ ,  $V_{CONT} = 3V$ ,  $C_{IN} = 0.1\mu F$ ,  $C_o = 2.2\mu F$  ( $V_o > -2.0V$ :  $C_o = 4.7\mu F$ ),  $T_a = 25^\circ C$ )

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_o$	$I_o = 30mA$	+1.5%	-	-1.5%	V
Quiescent Current	$I_Q$	$I_o = 0mA$ , except $I_{cont}$	-	130	200	$\mu A$
Quiescent Current at OFF-state	$I_{Q(OFF)}$	$V_{CONT} = 0V$	-	-	100	nA
Output Current	$I_o$	$V_o + 0.3V$	100	130	-	mA
Line Regulation	$\Delta V_o / \Delta V_{IN}$	$V_{IN} = V_o - 1V \sim -12V$ , $I_o = 30mA$	-	-	0.10	%/V
Load Regulation	$\Delta V_o / \Delta I_o$	$I_o = 0 \sim 60mA$	-	-	0.03	%/mA
Dropout Voltage(*2)	$\Delta V_{I O}$	$I_o = 60mA$	-	0.13	0.23	V
Ripple Rejection	RR	$e_{in} = 200mV_{rms}$ , $f = 1kHz$ , $I_o = 10mA$ $V_o = -7V$ Version	-	65	-	dB
Average Temperature Coefficient of Output Voltage	$\Delta V_o / \Delta T_a$	$T_a = 0 \sim 85^\circ C$ , $I_o = 10mA$	-	$\pm 50$	-	ppm/ $^\circ C$
Output Noise Voltage1	$V_{NO}$	$f = 10Hz \sim 80kHz$ , $I_o = 10mA$ , $V_o = -7V$ Version	-	100	-	$\mu V_{rms}$
CS Terminal Charge Current	$I_{cs}$	$V_{CS} = 0V$	4	5	6	$\mu A$
Output Resistance at OFF-state	$R_{O(OFF)}$	$V_{CONT} = 0V$ , $V_o = -7V$ Version	-	360	-	$\Omega$
Control Current	$I_{CONT}$	$V_{CONT} = 1.6V$	-	2	4	$\mu A$
Control Voltage for ON-state	$V_{CONT(ON)}$		1.6	-	-	V
Control Voltage for OFF-state	$V_{CONT(OFF)}$		-	-	0.6	V
Input Voltage	$V_{IN}$		-12	-	-	V

(\*2): Excludes  $V_o > -3.0V$  version.

The above specification is a common specification for all output voltages.

Therefore, it may be different from the individual specification for a specific output voltage.